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10TH DECEMBER, 1894.

LT.-COLONEL F. C. DENISON, M. P., C. M. G., President, in the chair.

CANADA'S MARITIME POSITION AND RESPONSIBILITIES.

BY H. J. WICKHAM, (Late Sub-Lieut., R. N.)

Before entering upon a discussion of Canada's present maritime position it may be interesting to note a few facts in connection with the early history of shipbuilding in this country. We learn from the Year Book that as early as 1723 shipbuilding was a branch of industry in Canada, six merchant ships and two men-of-war having been built in the colony during that year. In 1752 a 74-gun ship was built at Cape Diamond, Quebec, but it was wrecked in the launching. In 1810 no less than 26 vessels, having an aggregate tonnage of 5,836 tons, were built in the provinces. In 1812, 37 vessels were built at Quebec. In 1830-31, the "Royal William," the first steam-driven vessel that ever crossed the Atlantic, was constructed in the "Cove," Quebec, and supplied with machinery in Montreal. The archives say that the King's ship, "L'Original," was launched on the 2d September, 1750, and that "Le Canada," a 500-ton transport, was launched 4th June, 1742. "Le Caribou" and "Le Castor" were launched in May, 1844 and 1845, respectively. Work was also commenced upon a 22-gun frigate, the "St. Laurent." Since Confederation the increase in the number of Canadian steamers has been remarkable, rising from 335, with a tonnage of 45,776 tons in 1867 to 1,538 in 1893, with a gross tonnage of 241,172 tons. The steamers were more in tonnage in 1886 than they have been since, and this is probably accounted for by noting the transfer of ocean steamers from the Canadian to the British registry, a process which goes on from year to year, more or less, and in some years more than in others, unaccompanied, however, by change in ownership.

Taking steamers and sailing ships together, the years 1878 and 1879 saw the culmination of the development of our marine. In 1878 there were 7,469 vessels, with 1,333,015 tons, and in 1879 there were 7,471 vessels, with 1,332,094 tons, since which time it has fallen off considerably both in number and tonnage. The Government of Can-

ada have since Confederation done a great deal towards improving navigation, both by increasing the number of lighthouses, light stations, fog whistles, automatic fog horns, buoys, etc., and also by the building of graving docks. On 31st July, 1866, the Dominion Government took over from the Imperial Government the lighthouse at Cape Race, in Newfoundland. There are four graving docks in Canada, three belonging to the Federal Government and one owned by a company. The three docks owned by the Government are at Esquimalt, Kingston and Levis, whilst the largest on this continent, that at Halifax, is owned by a subsidized company. It can take in a vessel 601 feet in length. The "Teutonic" is 582 feet, whilst the "Campania" and "Lucania" are each 620 feet. In the matter of docking accommodation, Canada compares favorably with the other leading maritime nations. Since Confederation Canada has expended over twenty millions of dollars in improving navigation, etc. Of the natural advantages which Canada possesses it will be sufficient here to mention that the fact of her possessing not only good harbours upon the Atlantic and Pacific oceans, but also large coal deposits on both coasts, places her at once in a position of the first importance, whilst the occupation of her maritime population in connection with the fisheries on both coasts ensures in itself a reserve from which a constant supply of hardy seamen can be drawn, either for the manning of merchantmen in times of peace, or fighting-vessels in times of war.

A brief enquiry into the present conditions of the carrying trade of Canada will be necessary in order to form a just conception of what we have at stake at sea. Canada stands fifth in the countries of the world in the tonnage of her vessels, that tonnage being larger than the tonnage of either France, Italy, Russia, Spain, Australasia, the Netherlands, Austria-Hungary, Turkey, China or Japan. If registered tonnage alone were taken Canada would rank fourth, as the tonnage of the United States as given in the Year Book includes licensed and enrolled vessels. In the last three years in the shipping of the world, wooden vessels have decreased from 32% to 26% of the whole, whilst iron and steel ships have increased from 68% to 74%. Now, it is a very wearisome thing to keep quoting figures and statistics from blue books, and therefore I shall not trespass much further upon your patience in this respect, but I would ask you to take particular notice of the fact that whilst the ocean-borne interests of Canada have been becoming greater year after year, whilst the amount of merchandise which she imports, whether in the shape of raw material or manufactured goods for consumption, has been steadily increasing, and whilst the quantity and value of her exports (principally cheese, butter and cattle,) have been increasing to an enormous extent, the figures prove conclusively that the propor-

tion of British and Canadian tonnage doing that carrying trade has been steadily decreasing, and the proportion of foreign ships employed has been steadily increasing. The proportion of British and Canadian ships has decreased from 77.8% to 58.1%, and the employment of foreign shipping has increased from 22.2% to 41.9%, or nearly doubled between the five-year periods 1869-73 and 1889-93. Several reasons have been assigned for this decline, and amongst others it is suggested that quite a number of Canadian ships have been transferred to foreign registers to avoid the very stringent regulations of the British Board of Trade. The "Shipping Register" a month ago announced that 21 vessels had been transferred to foreign registers, and it is believed that a good many Canadians are amongst them. It is also said that the increase in the German lines has had a good deal to do with the crowding out of Canadian bottoms. Just a few more figures to give some idea of the magnitude of Canada's over-sea commerce and what she would have exposed to destruction in the event of Great Britain becoming involved in war with one or more naval antagonists, whose commerce destroyers might succeed in eluding, even for a time, the vigilance of the cruisers which Great Britain could spare over the number required as adjuncts to the fighting line of battle for scouting purposes. The amount in value of Canada's ocean-borne commerce, exports and imports during the year 1893, exclusive of her trade with the United States, amounted to over \$145,000,000.

In view of the magnitude of the interests involved, and leaving aside for the moment the question of the material benefits to be derived by Canada from the adoption of a more progressive maritime policy, I think I show an excellent reason why Canada should take more than a passive interest in seeing that the means provided for the efficient protection of her shipping in case of war are reasonably adequate to possible requirements. Here it becomes necessary to remark that a large number of Canada's wooden vessels, having been displaced in the Canadian carrying trade by more suitable iron and steam vessels, find employment in port to port traffic in distant parts of the world. Of course no account is kept of this trade in Canadian returns, but the value of these ships have to be added to the sum of Canada's interest at sea.

Canada, by spanning the British North American continent with railways, and by the improvement of her inland navigation, has secured internal communication from east to west; it now remains for her by a vigorous and aggressive maritime policy to persist in extending her communications east and west to feed her railway systems and develop her resources. Few people foresaw, when the Canadian Pacific Railway was first decided upon, that a large amount of its earnings would accrue from carrying tea from China across the

continent, and it may safely be predicted that in a few years the volume of the Pacific trade from Australia, New Zealand and other points will, if Canada seizes her opportunity, reach equally astonishing proportions.

Before we proceed to a consideration of the probable mode of attack by an enemy upon Britain's mercantile marine, and measures to repel the same, it would be well to put forward some of the principles which Captain Mahan deduces from the teachings of the effect of sea-power on history. He establishes that whilst the weapons and means of offence and defence and of propulsion, &c., may change from time to time owing to the march of science, that nevertheless there are certain principles which underlie the growth and development of sea-power which are immutable. He points out how some nations, such as Holland, with few natural advantages in the way of internal resources, have through the wisdom of their governments and the energy and enterprise of their people, acting upon these principles, established themselves as sea-powers and become rich and powerful, whilst others, whose wealth of internal resources have been the means of distracting their population from giving the necessary attention to their maritime interests, have lost and suffered from such neglect. In the conclusion which he draws as to the effect of the influence a government may have upon the sea career of its people, he says, "first, that in peace the government by its policy can 'favour the natural growth of a people's industries and its tendencies, 'to seek adventure and gain by way of the sea; or it can try to 'develop such industries and such sea going bent, when they do not 'naturally exist, or on the other hand the government may by mistaken action check and fetter the progress which the people left to 'themselves would make. In any one of these ways the influence of 'the government will be felt, making or marring the sea-power of 'the country in the matter of peaceful commerce, upon which alone 'it cannot be too often insisted a thoroughly strong navy can be 'based." "Secondly, for war, the influence of the government will be 'felt in the most legitimate manner in maintaining an armed navy, 'of a size commensurate with the growth of its shipping and the importance of the interests connected with it."

On all sides we find the nations awakening to the necessity of paying increased attention to the development of their maritime power, and for that purpose they are adopting a liberal system of subsidization. This is more especially true of France. One writer there lays it down that a maritime company can be assimilated to a railway company, the one or the other having the charge of serving a certain route. By subsidizing the maritime companies the state does not overstep in a greater degree the rational powers which all economists allow it, than when it creates gratuitously a national

route at the expense of the community. The country where the largest number of these routes converge will be the most prosperous by its industry and its commerce. The flag which the most rapidly and the most economically performs its transport duties will have the advantage over all the others. Premiums on speed are advocated instead of premiums on tonnage. He says, "Let us insist on this commercial truth—one of the highest importance: the speed of ships has the precious faculty of multiplying the productiveness of floating capital; it is consequently one of the most powerful elements which make for wealth." "Anyone can understand the importance of constituting a commercial navy, composed of swift ships, in order to have under our hand in time of war ships capable of cruising and forming blockades." If Canada is to maintain her maritime position amongst the nations of the world, there is one conclusion which must be forced upon the mind of everyone who reads Captain Mahan's book, and it is, that, independently of all other considerations, Canada's welfare as a sea-power is indissolubly mixed up with that of the mother country. As a powerful and efficient navy is a necessary adjunct to a numerous mercantile marine, so must a numerous and powerful mercantile marine form the reserve from which an effective navy can be forthcoming. And when we further consider that Great Britain already possesses those resting places and coaling stations necessary for the due protection and convenience of commerce in all parts of the world, ready to hand so to speak, and which no other nation possesses, how suicidal, from self-interested motives only, would be a policy looking towards independence, which would involve the abandonment of, I may say, practically all these advantages.

To be in a position, at all events, to speculate upon the line of action which would probably be taken by an enemy, let us pass briefly in review the present constitution of the two most powerful of the European Navies.

Great Britain, according to Secretary Herbert's report just published, has :

<i>Armoured.</i>	<i>In Service.</i>	<i>Building.</i>
Battleships.....	43	10
Coast defence vessels.....	12	..
Cruisers.....	18	..
	—	—
	73	10
FRANCE.		
Battleships.....	18	12
Coast defence vessels.....	21	1
Cruisers.....	4	7
	—	—
	43	20

GREAT BRITAIN.

Unarmoured.

Cruisers, protected.....	59	33
Cruisers.....	85	15
Gun vessels.....	60	..
Torpedo vessels.....	34	..
	238	48

FRANCE.

Cruisers, protected.....	16	14
Cruisers, protected.....	35	1
Gun vessels.....	80	5
Torpedo vessels.....	16	4
	147	24

The relative strength of each cannot of course be measured by numbers. Even in assigning a ship to a particular class as above designated, the authorities are frequently accused of misleading the public, for instance in describing a vessel as armoured which has not a sufficiently armoured citadel to prevent her from capsizing or sinking if the unarmoured ends were shot away or filled with water. Heated controversies have waged from time to time between different naval experts in England, chiefly on the amount of thick armour belting just above and below the water line which a battleship should carry. Both navies as they exist to-day are made up in the aggregate of a number of successive experiments, and to-day we have on the list of armoured cruisers, for example, such ships as the *Black Prince*, which was one of the first iron armoured ships built in the Royal Navy, 30 years ago.

In the construction of battleships the French, up to about six years ago, at all events, had given heavy armour belting protection at the water line to a greater extent than had the English in their battleships; the latter had relied more upon the protective deck and subdivision of ends for stability, thus enabling the carrying of heavier armour and guns at the citadel. Nothing short of actual test in warfare can decide the relative merits of the two schools. Nor must the capsizing of the "*Victoria*" be relied upon to condemn the subdivision plan, inasmuch as the bulkheads were not closed, as they undoubtedly would have been before going into action. The following are the battleships at present building by Great Britain: The *Cæsar*, *Hannibal*, *Illustrious*, *Jupiter*, *Magnificent*, *Majestic*, *Mars*, *Prince George*, *Renown* and *Victorious*. These are firstclass battleships, having (except the *Renown*, which is somewhat smaller,) a displacement of 14,900, I. H. P. 10,000, F. D. 12,000.

In looking through Secretary Herbert's report, however, I do not find that he says anything about England's torpedo boat destroyers of the Havock class. A reference to the July navy list will show that there are 32 of these vessels under construction.

As to what France might be expected to do upon a declaration of war, Admiral Aube, Minister of Marine, has been kind enough to give us a fair warning, and we find that quite recently Vice Admiral Cavalier de Cuverville in the *Revue Maritime et Coloniale*, March, 1893, makes use of the following language: "France should have, in our opinion, a certain number of ocean cruisers of great speed and range of action, always ready to be launched on the routes of commerce in pursuit of the enemy's trading ships." He then proceeds to describe the U. S. S. *Columbia* and concludes as follows: "In order to ensure peace with our neighbors and to dissuade them from joining the Triple Alliance, Admiral Aube asked for 20 cruisers of the first rank, and he was quite right."

My principal purpose in giving a somewhat detailed description of the British and French navies is to show that if Britain had to reckon with France alone, her navy, both the line of battle and most of the cruisers, would find their work cut out for them in European waters. This would be the case to a greater extent if England found two European powers against her instead of one. Another French naval authority (*Contre Admiral Reveillere*) after reviewing the forces that would be opposed to each other in the case of war between England and France, concludes by saying:

"We can damage England:

"1.—By preventing her merchant ships fetching their ports by means of small ships of high speed; by stationing torpilleurs and aviso-mortar vessels at Brest, and in the channel and by launching them from our ports, making them, when pursued, take refuge in the numerous bays of our coast.

"2.—By keeping the English ports and coasts under a continual menace of bombardment by means of aviso-mortar vessels.

"3.—By cutting the commercial communications of Great Britain with Suez, by means of cruisers and torpilleurs stationed on the coasts of Provence and Algeria.

"4.—By means of our submarine torpedo boats carrying panic-clastite we can play our enemy some very bad turns in our roads and off the entrance to our harbours.

"5.—By converting all our fast merchant steamers into cruisers."

Lieutenant Crutchley estimates that out of 1000 merchant steamships belonging to France and Russia it would be reasonable to suppose that at least 30 very fast ones could be equipped for the purpose of commerce destroying. The subject of partially arming the mercantile marine is not by any means a new one; it has recently

been discussed by naval men, both in the theatre of the Royal United Service Institution and in the press. It comes up naturally in connection with measures for the protection of the trade routes. Some doubt has been cast upon the right of merchant ships to fight in self-defence to avoid capture, and the better opinion would seem to be that a captain of a merchant vessel who fires a gun would at all events be liable to have his ship sunk and nobody picked up by the enemy's boats. Some have gone so far as to say that since the Declaration of Paris the crew might be treated as pirates. The mercantile marine of Britain, however, occupies an exceptional position and requires exceptional measures for its protection. In round numbers it may be said that British shipping does about 70% of the whole trade of the world, and with such immense interests at stake it will not do for Great Britain to frame her policy too much in deference to the susceptibilities of foreign powers. It has been said that the British fleet would be prepared to make a torpedo attack on an enemy's fleet and harbours the first night after war is declared! If we propose to move so quickly we must at least be prepared to give the enemy credit for great activity about the same time. No matter how complete a system of organization we may have, it goes without saying, that for a considerable time after the declaration of war a large proportion of our merchant shipping would remain ignorant of the fact, and that in the meantime an enemy, whose cruisers are so constructed as to carry a coal supply sufficient to take them round the world, would be able to do incalculable damage, unless at all points the means are found to drive them off the sea. In most of the discussions that have taken place upon this subject it has been usual to cite the case of the *Alabama* as illustrating the damage which a single cruiser can do to the mercantile marine of an enemy. It is true that since her day conditions have changed, and it may be argued that owing to the development of telegraphic communication, the want of coaling stations by nations other than Great Britain, and other circumstances, that it would not now be possible for an enemy's cruiser to work such dire havoc upon our merchant vessels as did the *Alabama* upon the ships of the American mercantile marine. Whilst on the subject of telegraphic communication, it may be noticed that there is some divergence of opinion as to whether or not submarine cables could be easily cut by an enemy, and a leading article in, I think, the *Army and Navy Gazette*, not long ago, expressed the opinion that it would not be so easy to cut cables as some people imagine, basing this opinion upon the fact that cable repairing vessels, with all their equipments and men trained to the work, often took several weeks in grappling and repairing a cable, but the writer of that article evidently had not present to his mind that the process of grappling a cable for the purpose of repairing is a long one, owing to

the necessity for gradually raising the bight at different points and buoying it until sufficient slack is obtained to bring it to the surface. A ship dragging for a cable for the purpose of cutting it only would not be hampered by any such considerations, and the grapnel used would be so constructed as to cut the cable directly it was caught. Then again, the destruction of the cables would undoubtedly tell against us far more than against any enemy at sea. Another matter which would affect most seriously British trade, is the power to keep open the Suez Canal. Upon this point also opinion seems to be divided, though a large majority of those whose opinions I have been able to gather think that it would be impossible to keep it open. One speaker described what occurred at Port Said, when, from the grounding of a ship in the canal, it became blocked for 24 hours. He said that the next morning there had arisen in the harbour at Port Said a perfect forest of funnels, and there was hardly standing room, so to speak, inside. The speaker, H. S. H. Prince Louis of Battenberg, says: "I take it, the canal would be effectually blocked at the outset, probably before war was actually declared." This becomes all the more important when we remember that, for the purposes of British trade, the Suez Canal commences at Gibraltar and ends at Aden. The traffic with the East, which would thus be completely obstructed in its usual channel, would be diverted either to the Cape or trans-Canadian route, and this alone should make Canadians anxious to see that every effort possible should be made to render the latter route secure. After reading the various discussions which have taken place between eminent naval authorities as to the methods which could be adopted to protect our merchant vessels, and the means at hand wherewith to protect them, one is forced to the conclusion that unless Great Britain so effectually crushed her enemies at sea at the outset, and so crippled their fighting fleets as to set a large part of the British fleet free to be employed for the purposes of commerce protection, Great Britain has not, nor under the present system does it seem possible that she can have, a sufficient number of armed cruisers, over and above what would be required for scouting purposes in connection with the fighting line of battle, to adequately protect our trade routes. In fact, in a recent discussion which took place in the theatre of the R. U. S. I., this proposition was assumed at the commencement and its correctness was not denied by any of the distinguished naval officers present. And would it not obviously be the tactics of any of England's possible enemies in the first place to engage the attention of her whole fleet in keeping the enemies' line of battle blockaded in its own ports, so that their commerce destroyers might have the best possible chance of attacking Britain in her most vulnerable point in all parts of the world. Admiral Nicholson, who had given this subject a great deal of thought, says in this connec-

tion, "I think, as regards the first question, there can be very little doubt that any attempt to patrol these vast routes will only lead to failure. Suppose we had twice the number of fast cruisers that our enemies had, and that I think is taking a very extreme view, what would be the mission that these cruisers would have thrust on them? There would be the enemy's cruisers, who would lurk about at certain points of the trade route, with his engines stopped, his fires ready undoubtedly, but his engines stopped, watching for his prey, waiting for days or even months, with but little expenditure of coal. On the other hand what would our cruisers have to do? They would have to be racing up and down, patrolling the trade route, to find the enemy's cruiser and attack it. I believe that I shall be quite in limits if I say that the consumption of coal on the ship that has to patrol would be in excess of the coal used by the other by about three to one; and, as I think you will all admit that the power of the cruiser is the limit of coal endurance, we shall not have to provide twice as many ships, which I previously supposed to be a fair proportion, but we must multiply this number by three, because they will use three times as much coal. Therefore, to put us in a decent state of security we must be prepared to put on these trade routes six times the number of cruisers possessed by the enemy. That is a very serious matter." And he goes on to point out that in order to provide enough cruisers for this purpose it would be necessary to ask the people for a sum of money that would be impossible. It is said that, as matters stand at present, and taking for instance the P. & O. S. S. Co., that one-fourth of the entire number of officers employed by that company belong to the Royal Naval Reserve, together with a large number of the men, and the absurdity is pointed out of sending to sea, ships manned by officers and men, upon whom we have largely to rely for the manning of fighting ships directly on the outbreak of war, and yet have the very ships upon which these men are employed liable to become a prey and captured by a wretchedly armed enemy for the want of carrying adequate means of defence. Of course, until a war does actually break out, speculate as we may upon probable events, it is impossible to foresee what may happen, but we may be reasonably certain that the first advantage, which counts for a great deal nowadays, will fall to the side that is best prepared. There seems to be a widespread idea that the British Admiralty have well worked out plans for the arming of certain ships in the event of war, but what these plans are, or what their scope may be, not even naval officers of high standing seem to know. Admiral Nicholson, speaking above on the general question of arming merchantmen, says that it may possibly be that this matter has been thoroughly worked out, but he thinks it is very important that such plans as do exist should be given to the nation at large. He

admits that they cannot be given to the nation without giving them also to others who might at some time be our enemies, but he thinks the advantage would be very much on our side, because what we have so greatly to fear is the panic and disorganization which will seize upon the whole mercantile population at the first outbreak of war. From some items which have appeared in the newspapers we may conclude that the British Admiralty have, since the date of the above mentioned discussion, had under their consideration plans on this very subject.

From the opinions of naval officers upon the subject of commerce protection already cited, and from what appears to be tacitly admitted by most naval authorities, we may safely assume, what was in fact assumed for the purposes of the argument and discussion thereon I have before referred to:

1.—That men-of-war cruisers at present are not in excess of our requirements for blockade and scouting purposes, and also for keeping clear of enemies the entrance and immediate approaches to our home and principal ports.

2.—That there are therefore not enough of these vessels to patrol with any approach to efficiency the main trade routes of the world.

In addition to the men-of-war cruisers then, let us see what we have of merchant steamers, under subvention from the Admiralty, and fitted or partially fitted so that they may be used as cruisers. On the list given in Lord Brassey's Annual for 1894 we find there are only ten of these, namely, the "Etruria" and "Umbria" of the Cunard Line, the "Majestic" and "Teutonic" of the White Star, the "Victoria," "Britannia," and "Oceana," of the Peninsular and Oriental S. S. Co., and the "Empress of India," "Empress of China," and "Empress of Japan," of the C. P. R. Company. The "Umbria" and "Etruria," it will be observed, are still kept on the list as receiving the subvention, although the "Campania" and "Lucania" are much larger ships, and I have heard it stated are also liable to be used as cruisers. On looking at their plans, however, it will be seen that a large amount of their machinery, including portions of the main cylinders, are considerably above the water line, but it is elsewhere stated that they are classed as armed cruisers, for service when required by the Admiralty, and they have also been built to comply with the required conditions and coal endurance. They have, amongst other provisions, water-tight coal bunkers at the side of and over the top of the boiler compartments, forming a protection against the modern quick firing gun. The "Etruria" and "Umbria" are classed as having a speed of 19.5 knots, with an indicated horse-power of 14,500. The three Canadian Pacific Railway Company's ships are classed as having a speed of 16 knots only, as have also the three ships

belonging to the Peninsular and Oriental S. S. Co. I am leaving the "Teutonic" till last, as I wish to go as fully as possible into her construction. In addition to the ten above named there are 12 others held at the disposition of the Admiralty belonging to the White Star, the Cunard and the Peninsular and Oriental Companies. The fastest is the "Servia," with a speed of 16.5 knots. The rest range from 14 to 16 knots. India has 3 gunboats: The "Assaye" and "Plassy," steel, twin screws, built at Elswick in 1891; 735 tons, and have a speed of 21 knots. They each carry two guns. The third is a paddle despatch vessel.

The Australian Navy consists of five special secondclass cruisers, viz.: The "Wallaroo," the "Tanranga," the "Ringarooma," the "Mildura," and the "Katoomba." These vessels are built of steel, 2,575 tons, speed 19 knots; they have protective decks of 2-in. steel on the slopes and 1-in. on top, and carry eight 4.7-in. Q. F., eight 3-pdr. Q. F., four machine guns, and one light gun under 15 cwt.; they also carry two fixed or bow tubes for discharging Fish torpedoes and two launching carriages for Fish torpedoes. They carry 300 tons of coal, sufficient to steam 4800 knots at a 10 knot speed; two firstclass torpedo gunboats of the "Sharpshooter" class, i. e., of steel, 735 tons; speed 20 knots, with two 4.7-in. Q. F. and four 3-pdr. Q. F., and five torpedo tubes. They carry sufficient coal to steam 2500 knots at a 10 knot speed. Victoria has also two twin screw steel gunboats, the "Victoria" and "Albert," of 12 knot speed, and four iron gunboats, the "Batman," "Fawker," "Gannet," and "Lady Loch," which carry one 6 in. 4 ton gun each. Queensland has two twin screw steel gunboats, the "Gayundah" and "Paluma," similar to the "Victoria" and "Albert," and three small steel gunboats, the "Otter," "Bonito," and "Stingaree," carrying one 64-pdr. muzzle-loading rifle gun each. South Australia has one twin screw gunboat, the "Protector," like the "Victoria." In addition, the "Cerberus," a turret coast defence vessel of 3,480 tons, is maintained at Melbourne.

The "Teutonic" was the first specially constructed mercantile armed cruiser. Proposals were made by Mr. Ismay of the firm of Ismay, Imrie & Co., the managing owners of the White Star Line, as far back as 1878, when he urged upon the attention of the Admiralty that a fast mail or passenger steamer may be as efficient a factor in a naval war as an ordinary war cruiser, and offered to make an agreement to hold at the disposal of the Admiralty, upon terms then specified, certain ships for the purposes of the State in time of war. The matter lay dormant until August, 1886, when Messrs. Ismay, Imrie & Co. revived it by offering, on behalf of the White Star Line, to build two ships, to be approved by the Admiralty, of a speed and strength superior to any merchant ship afloat, with engines and boilers below water, complete subdivision by bulkheads, fittings for

guns built in during construction, and manned by half crews of Naval reserve men. An agreement was come to, and the plans for these ships were submitted to and approved by the Admiralty from their very inception. The "Teutonic" is so arranged that 12 guns can be mounted within 48 hours after arrival in port. Her length is 582 feet (capable of being docked at Halifax, as before mentioned,) beam 57 feet, and depth of hold 39 feet 4 inches. She is fitted with triple expansion engines, one for each screw, of 17,000 I. H. P. The manner in which the hulls of the "Teutonic" and her sister ship, the "Majestic," have been put together is not only novel, but marks a great improvement in marine naval construction so far as increased strength is concerned. In the first place, the plates used for their outer shells are of unusual dimensions, being three feet in width and many of them twenty-four and twenty-eight feet in length—dimensions not possible if steel had not been used in making them. Instead of being put together end to end and butt-riveted, they are laid on the steel frame so as to overlap each other vertically, and then trebly, quadruply and even quintuply riveted together. In fact, unless welded together the plates of the hull could not be more compactly united.

The vessels have each four decks, made by covering strong steel beams with plates of the same material trebly riveted together. In addition to the seventeen transverse bulkheads which hold the sides of the vessel in a rigid grip, there is a longitudinal bulkhead running through the centre of the ship for three-fourths of its length from the keelson to the main deck, which, like a huge backbone, locks all the parts of the hull together. The twin screws are fitted to overlap at the tips, the starboard screw being carried some feet further aft than the other in order to get clearance. No outside stern tubes, in the proper acceptance of the term, are used, for the propeller shafts are carried out in what are really protuberances of the hull in the run of the vessel. The two sets of engines in the "Teutonic" are not only divided from each other, but, according to the requirements of the Admiralty, are placed well below the water line. The "Teutonic" and the "Majestic" when armed carry 12 Armstrong guns, 8 on the upper and promenade decks and 2 each on the turtle backs. These guns are quick-firing and capable of discharging 12 shots a minute, and are fitted with oil buffers which absorb the recoil. The value of these vessels as troopships will be readily understood from the following facts: Accommodation on each of them can be provided for 1000 cavalry and their horses, or for 2000 infantry. They could reach Halifax in 5 days and Cape Town in 12½ days; via the Suez Canal they could land troops at Bombay in 14 days, at Calcutta in 17½, at Hong Kong in 21, and at Sydney in 22 days. Their coal supply is sufficient for 17 days steaming at full speed, or at half speed for three months. In case, therefore, of the Canal being closed,

they could steam to Bombay via the Cape, 10,733 knots, in 22 days, without coaling on the way.

Having now given as accurate a description as I have been able to obtain of the "Teutonic," which I regard as the type of the most effective mercantile cruiser we have, I propose to describe two Admiralty cruisers now building, the "Terrible" and "Powerful." The description of these two cruisers is taken from a Parliamentary paper quoted in Lord Brassey's Naval Annual, 1894: "The designs for the two firstclass cruisers, "Powerful" and "Terrible," for which provision is made in the Navy Estimates for 1893-4, have not yet been completed, and the dimensions must therefore be considered as still open to some modification." The principal dimensions as now settled are as follows: length, 500 feet; breadth, 71 feet; mean draught with keel, about 27 feet; displacement about 14,200 tons. "The continuous sea speed for smooth water steaming and with a clean bottom is to be 20 knots. On an eight hours' natural draught contractors' trial the speed will be about 22 knots. The steel hull will be wood-sheathed and coppered, so that the vessels may keep the sea for long periods without serious loss of speed. A coal-bunker for capacity of about three thousand tons will be provided, and, at the above-stated draught and displacement, about half that weight will be carried. The armament will include two 9.2-in. guns, mounted as bow and stern chaser, twelve 6-in. quick-firers (four of which will be capable of firing right ahead and four others right astern), eighteen 12-pounder quick-firers, twelve 3-pounders, besides smaller machine guns. Armour protection will be provided for all the 9.2-in. and 6-in. guns, and the 12-pounder guns on the upper deck will be furnished with strong shields, revolving with the guns. The torpedo armament includes four submerged torpedo discharges, placed in two separate rooms. The engines, boilers, magazines and other vital portions of the ship will be placed below a strong curved steel deck, having a thickness of four inches for a large proportion of the length, with a slight reduction of thickness towards the extremities. This deck will be associated with minutely subdivided coal bunkers extending up to the height of the main deck, these features of protection being identical with those which have been adopted for other firstclass cruisers of the Royal Navy. Most careful study has been bestowed upon all matters relating to the protection of the armament and the guns' crews, and the transport of the ammunition from the magazines to the fighting positions of the guns. An armoured conning tower, placed at the after end of the forecastle, will give protection in action to the commanding officer. A great height of freeboard has been provided in association with a long poop and forecastle, upon which the bow and stern chase guns will be carried. This will secure not merely the power of fighting the guns in heavy weather, but also that of main-

taining the speed at sea. In order to secure the sea-speed above mentioned, it has been necessary to provide for engines and boilers capable of developing a very large horse-power. After full consideration it has been decided to adhere to twin screws and not to adopt triple screws; experience in the "Blake" and the "Blenheim," as well as in the large twin screw steamers of the mercantile marine, having established the complete efficiency of such propellers within the limits of power and draught contemplated.

We learn from *Engineering* that the contracts have now been let for the construction of the hulls of these vessels at £338,000 and £345,000 respectively, and the same journal informs us that the engines and boilers will cost about £100,000 each set.

We have in the "Campania" a high speed mercantile vessel which compares in tonnage and speed very closely with the "Powerful" and "Terrible" class. The "Terrible" class will be superior in fighting and resisting quality to any regular armed cruiser now afloat, and it remains to be seen what cargo-carrying capacity could be given them by somewhat reducing the weight of their armour and diminishing their guns to such a number as would be carried in times of peace by the class of cruisers I am advocating. The published figures of the "Powerful" and "Terrible" give them a 4-in. protective steel deck, the weight of which with the armament would be about 2000 tons. If the weight of armament and protected deck is reduced one-half and the coal carried is reduced to the amount which suffices the "Campania" for one high speed trip across the Atlantic, namely, 2000 tons, we have left 2000 tons apparently available for cargo, figures which compare favorably with the 1600 tons cargo capacity of the "Campania." It would therefore seem not too much to say that, on a route in which the passenger traffic is not so prominent a feature as it is in the transatlantic trade, the "Campania" might retain at least the same cargo-carrying capacity and have added sufficient armament, offensive and defensive, at the expense of reducing the passenger accommodation. We have also the cost of the hull and the machinery of the "Powerful" and "Terrible," £438,000 each. So that £500,000 each would be a liberal figure to assign as the cost of an ordinary passenger and fast freight steamer of the same tonnage and speed.

The Huddart scheme of four 20 knot vessels on the Atlantic service and five 16 knot vessels on the Pacific services is to involve a capital of £3,000,000. Nine vessels of the size and capacity of the "Powerful" class, as shown above, would cost about £4,500,000.

The details and tonnage of the Huddart vessels are not published, but they would probably compare very closely with the present C. P. R. "Empress" ships of about 5,900 tons and 16 knots. It seems a very fair assumption that the 50% greater cost of the nine mercantile "Terrible" class is more than met by 50% greater

capacity. I have instituted these comparisons not as advocating ships of the size and description of the "Terrible" as best suited to our needs all round, but as giving a reason for the faith that is in me, that, by the application of modern science, ships can be designed of sizes varying to suit circumstances which meet the requirements of modern fast freight and passenger ships, which in times of peace need not carry their whole armament, but which on the declaration of war may rapidly be transformed into cruisers as efficient as need be. *In designing modern men-of-war cruisers, great reserve coal carrying capacity is provided to give great range of action. The principle which I wish to emphasize is that that reserve space should be utilized for cargo carrying in mercantile cruisers in peace times.*

Referring to the discussion that took place at the Ottawa conference, we find at pp. 278 *et seq.* of the printed report, some very interesting information as to what is going forward with regard to subsidizing fast steamship lines upon the Atlantic and the Pacific. It is stated that the Dominion Government are prepared to subsidize to the extent of three-fourths of a million dollars per annum two complete fast services, a weekly one on the Atlantic and a fortnightly one on the Pacific: in fact that the Dominion Government have already made a conditional contract with Mr. Huddart on those lines, the condition being that within a specified time Mr. Huddart shall complete his arrangements with the other governments interested. Mr. Foster says that after they get the consent of Parliament to that \$750,000 subsidy Mr. Huddart has three months to complete his scheme. Lord Jersey points out that the subsidy asked for by Mr. Huddart, £300,000 per annum from all the Governments interested, amounts to 10% on the capital required to establish the line, and further remarks that this request being a very "strong" one, he is inclined to think that the British Government will require very full information before they would accede to such a request.

It was further pointed out at the conference that most of the mail subsidies granted by the British Government fall in within the next few years, and the Imperial Delegate, Lord Jersey, intimated that in granting new subsidies the British Government wish to consider not merely one particular line but the whole question. I feel convinced that Great Britain and her great self-governing colonies, by uniting in a well considered and comprehensive scheme for the liberal subsidization of fast steamship lines of the class I advocate between the various parts of the Empire, to be manned and officered exclusively by trained men of the Royal Naval Reserve, and always ready for an emergency, will secure the means whereby our trade routes will receive adequate protection, and the means adopted, by facilitating and stimulating inter-imperial and inter-colonial trade, will build up and solidify the Empire.

Such a policy will give to Canada a splendid opportunity for developing her ship building resources. The Province of Nova Scotia possesses such large deposits of iron ore, coal and flux, in close proximity to each other and to ship harbours, that capital and skill should find a splendid opening for successful enterprise.

The establishment of Naval Reserve ships at Halifax and Vancouver for the training of Naval Reserve men would do much to foster and promote that maritime spirit which has made Great Britain what she is to-day.

It may be interesting to hear what Vice Admiral Meade says at a recent meeting of the Society of Naval Architects and Marine Engineers.

On November 15th, at New York, on the subject of the swift cruisers recently added to the American Navy, such as the "Columbia," "Minneapolis" and "Detroit," he says, "And they are unsatisfactory for these reasons: The smaller vessels cannot cruise in time of war except in home waters; and as to the larger ones, such as the 'Columbia,' it is feared that vessels like the 'Majestic' and 'Teutonic,' for instance, may laugh at our three screw racers which cannot cross the ocean at the same speed these commercial greyhounds maintain year in and year out. Moreover, as to the question of fighting, I doubt very much the superiority of the 'Columbia' over the American liner 'New York,' with the latter suitably armed, as she would be in the service of the Government, while as to coal capacity the 'New York' and 'Paris' are by far her superiors."

The whole question of the protection of the trade routes and commerce generally is one which would seem to demand reorganization, to avoid confusion at the outbreak of war. In the history of convoy many interesting and instructive lessons may be gained, but the subject is too large a one to be more than briefly touched upon. In olden times the duty of protecting convoys was naturally very distasteful to captains of British men-of-war, who always preferred meeting and fighting the enemy to having to avoid him. It is the consensus of opinion that in the early days of a great naval war there would be a demand for commerce-protectors unparalleled in the annals of the world.

The intercolonial conference held at Ottawa last year, in which we may say Canada was the prime mover, will, it is hoped, do much towards removing obstacles in the way of closer union between the different parts of the Empire in commercial matters. The question of the due protection of the trade routes may well form the subject for arrangement at another such conference at an early date. A solution of the problem would seem to lie in the direction of separating, to some extent, the duty of commerce protection, from that of the fighting line of battle, and placing the responsibility therefor under

a distinct department of the Admiralty. Naval Reserve ships should be stationed at the principal Colonial ports, in which the officers and men who will man our mercantile cruisers will be kept constantly drilled in the use of the weapons they will have to use. The captains of these cruisers would hold dormant commissions, which would come into effect upon a declaration of war. At the Ottawa conference a complete system of telegraphic communication, with cables touching only British territory, was discussed, and one of the most valuable services which such a system of cruisers could render would be the protection of our telegraphic communication.

The captain of one of the C. P. R. "Empress" ships informed me that there were many young seamen in the Colonies and elsewhere who were anxious to join the Royal Naval Reserve, but they found it impossible to do so without going to England for that purpose and becoming enrolled there. Here is a matter which undoubtedly should receive the attention of the Admiralty.

One great advantage of the scheme above indicated for equipping a commerce protective navy, composed of mercantile cruisers, is that it is susceptible of gradual development. What is wanted is intelligent co-operation on a well matured plan.

There is no reason why the friends of Preferential Trade amongst Imperial Federationists should relax their efforts, although the goal they seek to attain appears as yet to be very far off. In the meantime, to the extent to which the means of inter-communication and traffic between Great Britain and her various colonies are developed by state aid, to that extent is an advantage in trade obtained over foreign nations.

There is no doubt but that the Colonies should contribute towards the protection of their commerce, but the amount of such contribution or the manner in which its expenditure should be controlled cannot be settled in the easy, rule of three, manner, suggested by our friends of the Imperial Federation (Defence) Committee. In the first place, the strength of the British Navy, as it exists to-day, is determined by the armament from time to time maintained by France and other European nations. Great Britain must at all times keep command of the seas, otherwise her sources of supplies, both for food and raw material, would be liable to be cut off, and if cut off for only a short time it would mean her ruin. Therefore, come what may, the British Navy must be kept up to a strength to cope with any two of the Navies of Europe, and that quite irrespective of the size and importance of colonial trade. If the naval scares which have taken place in England recently mean anything, they mean that the English people are apprehensive that their navy is not being kept up to the standard which will ensure the safety of the British Isles. A perusal of the Naval Defence Series published for the Council of the

London Chamber of Commerce would seem to show that, so late at all events as 1893, this apprehension was well grounded. So far as one can judge, if it comes to a war with a first-rate power, every available ship not required to actively engage the enemy or watch his ports will be required, not to protect colonial trade in the distant parts of the world, but to ensure a supply of food and raw materials for the inhabitants of the British Isles, and that being the case it is only reasonable, if the colonies are to be called upon to contribute to the expense of the British Navy, that a plan shall be worked out that will ensure their interests being properly safe guarded.

